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## Design and optimization of beam optics for a superconducting gantry

Design study of a lightweight superconducting gantry applied to proton therapy was performed at HUST. By using alternating-gradient (AG) CCT magnets, the footprint and weight of the gantry can be significant reduced. Meanwhile, a large momentum acceptance avoids the requirement of fast magnetic field change of superconducting magnets during tumor treatment. We presented a beam optics design for this superconducting gantry with downstream scanning. Considering the operating mode in large momentum acceptance, second order aberration and fringe field effect have been studied using COSY INFINITY for optics optimization. And particle tracking is performed for design validation.

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